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COPING AND DRINKING MOTIVES IN A VETERAN SAMPLE

by

Jordan A Fields

A Thesis

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Abstract

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PTSD is highly comorbid with alcohol abuse and veterans appear to be a population at high risk for developing these problems. Maladaptive coping behaviors have been linked to the development of PTSD and alcohol abuse. Additionally, understanding more about the way one copes and why they report consuming alcohol may be important to understanding this relationship. This study examined coping style and drinking motives as mediators of PTSD-AUD (Alcohol Use Disorder) problems in 60 Operation Enduring Freedom/Operation Iraqi Freedom veterans. PTSD did not predict alcohol consumption variables. The PTSD group scored higher on drinking consequences, and drinking to cope. The PTSD group endorsed more emotional discharge coping, whereas the non-PTSD group endorsed more seeking alternative rewards. Drinking to cope mediated the relationship between both PTSD and drinking consequences. The results highlight the importance of teaching coping skills as well as assessing the motivation behind veterans' alcohol consumption.

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Coping and Drinking Motives in a Veteran Sample

Introduction

PTSD and Alcohol Misuse

Posttraumatic stress disorder (PTSD) is highly comorbid with alcohol use disorders (Stewart, 1996). Green and colleagues (1992) conducted a 14-year follow up examination of a trauma-exposed sample due to a natural disaster and found a current diagnosis of PTSD to be related to a diagnosis of alcohol abuse. In a large national probability sample of adult women exposed to criminal victimization, a positive diagnosis of PTSD was associated with participants being 2.2 times more likely than a non-PTSD control group to meet criteria for drug abuse or dependence and 1.6 times more likely to meet criteria for alcoholism (Kilpatrick & Resnick, 1993). In the Saint Louis Epidemiologic Catchment Area survey, PTSD sufferers were 1.6 times more likely to have a diagnosis of an alcohol use disorder than those without PTSD (Helzer, Robins, & McEvoy, 1987).

In particular, military veterans appear to be at high risk for developing PTSD and co-occurring drinking problems (Norman, Inaba, Smith, & Brown, 2008; Ouimette, Ahrens, Moos, & Finney, 1997; Rona et al., 2009). A study of Vietnam and Korean War combat veterans found that PTSD was the most common comorbid diagnosis in patients classified as alcohol abusers, with 60% meeting criteria for PTSD (Branchey, Davis, & Lieber, 1984). In a sample of veterans diagnosed with PTSD from these wars as well as World War II, 41% screened positive for comorbid alcohol abuse (Davidson, Swartz, Storck, Krishnan, & Hammett, 1985). Streimer and colleagues (1985) found that of Australian Vietnam veterans who screened positive for PTSD, approximately 38% also

screened positive for alcohol abuse or dependence whereas the prevalence of alcohol abuse and dependence was 29% in the rest of the sample.

A recent study of Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) veterans found that 39% of the veterans screened positive for either PTSD or alcohol abuse problems. In this study 27% screened positive for problems with hazardous alcohol use only, 6% screened positive for PTSD only, and 6% screening positive for problems with both (Erbes, Westermeyer, Engdahl, & Johnsen, 2007). In another recent study Jacobson and colleagues (2008) examined heavy weekly drinking, binge drinking, and alcohol related problems among Reserve and National Guard personnel. The baseline prevalence for each outcome among Reserve and National Guard personnel was 9.0%, 53.6%, and 15.2% respectively, with new onset rates of heavy weekly drinking, binge drinking, and alcohol related problems of 8.8%, 25.6%, and 7.1% respectively. For each of the outcome measures active-duty personnel with combat exposure had the highest rates when compared to active-duty personnel deployed without combat exposure and nondeployed personnel (Jacobson et al., 2008). These studies highlight the prevalence of both PTSD and substance use problems in veterans.

Studies also indicate that PTSD patients have poorer outcomes in substance abuse treatment than those with other psychiatric disorders (Ouimette et al., 1997; Ouimette, Ahrens, Moos, & Finney, 1998). Ouimette and colleagues (1999) evaluated functioning and coping in PTSD-SUD (Substance use disorder) patients two years after treatment. They found that PTSD-SUD patients consumed greater amounts of alcohol and had significantly more problems related to their substance use than SUD patients with other psychological disorders or patients with only SUD. Studies like these indicate that PTSD

is a risk factor for poorer outcomes in SUD patients. Because PTSD and SUD comorbidity is related to such negative prognoses it is quite important to develop an understanding of the etiological and maintenance factors for this relationship.

Development and maintenance of PTSD and substance use disorders.

Despite the sizeable literature indicating the relationship between PTSD and SUDs, in particular problem drinking, there is no consensus on the etiology of these highly comorbid conditions. The most frequently used criterion for determining self-medication motives as opposed to other mechanisms is the presence of PTSD prior to alcohol abuse, but Stewart (1996) proposed that other than order of onset, the patient's perception of the relationship between their symptoms and drinking should be considered. This study examined the subjective relationship between alcohol consumption and psychological distress.

Currently three causal pathways have been proposed as theoretical explanations of co-occurring PTSD and alcohol use (see Table 1).

Table 1 Causal Pathways Studies Outcomes

Population/Sample	Outcome	Reference
Adults, epidemiologic study	Cocaine/Opiate use increased risk for PTSD	Cottler et al., 1992
Female Adult Sexual Abuse survivors	Drinking to cope with distress and tension-reduction expectancies predicted problem drinking	Ullman et al., 2005
Adults, 5year longitudinal study	PTSD increased risk for drug abuse	Chilcoat & Breslau, 1998
Persian Gulf veterans	PTSD predicted drug use but not alcohol use	Shipherd et al., 2005

The first pathway is the *high-risk theory*, which asserts that drug and alcohol problems occur before PTSD develops. According to this theory, drug and alcohol users encounter riskier situations which may lead to traumatic events, and therefore they are at greater risk for developing PTSD (Cottler, Comptom, Mager, Spitznagel, & Janca, 1992). The second pathway is called the *susceptibility hypothesis*; this theory supposes that drug users have an increased likelihood of developing PTSD following a traumatic event.

Individuals may become more susceptible to developing PTSD because of the use of ineffective coping behaviors related to their substance use or neurochemical changes in the brain due to extensive drug use. The third causal pathway and the most prominent is the *self-medication hypothesis* (Ullman, Filipas, Townsend, & Starzynski, 2005).

Through this pathway the development of PTSD following a traumatic experience causes, the subsequent substance use problems. The self-medication hypothesis implies that people with PTSD use substances as a way of reducing distress tied to PTSD symptoms (Chilcoat & Breslau, 1998). Determining the functional relationship between PTSD and the development of SUDs is difficult. One key factor is the order of onset. A study of

Vietnam veterans found that PTSD symptoms typically preceded alcohol and substance use and that alcohol consumption paralleled PTSD symptom severity escalation (Bremner, Southwick, Darnell, Charney, 1996). In a 5-year longitudinal study of over 1,000 adults, Chilcoat and Breslau (1998) found that PTSD increased risk for drug abuse, but preexisting drug abuse did not increase risk for PTSD. In a longitudinal study of Persian Gulf War veterans PTSD symptoms were found to predict drug use but not alcohol consumption (Shipherd, Stafford, & Tanner, 2005).

The majority of studies examining the relationship between PTSD and SUD development yield findings supporting the self-medication hypothesis (Waldrop, Back, Verduin, & Brady, 2007; Ullman et al., 2005; Chilcoat & Breslau, 1998). The presence of substance abuse prior to the development of PTSD may indicate the high-risk theory or the susceptibility hypothesis. Cottler and colleagues (1992) found that cocaine and opiate users were at increased risk for reporting a traumatic event, developing PTSD, and reporting more traumatic events. In a test of causal pathways between PTSD and drug disorders Chilcoat and Breslau (1998) found that drug abuse or dependence resulted in a slight increase in the risk of developing PTSD after exposure to a traumatic event. Coping plays a vital role in the development of both PTSD and SUDs and is critical to an understanding of dually diagnosed individuals. Additionally, the hypothesized use of alcohol as a coping mechanism in individuals with PTSD makes coping behavior and coping motivated alcohol consumption highly important to study concurrently.

Coping

Evidence suggests that an individual's choice of coping strategy can either buffer or exacerbate the impact of life events (Solomon, Mikulincer, & Flum 1988). Coping

style has short-term effects with respect to the resolution of a specific stressor and long-term effects related to mental and physical well-being. Moos and colleagues (1990) developed a model of coping which asserts that aspects of the environmental system, the personal system, characteristics of immediate stressors, and an individuals' appraisal of the situation all provide a context for the selection of coping responses.

Coping is often defined in terms of higher order constructs, which encompass a myriad of potential behaviors. One of the most common methods of describing coping is to identify the purpose of a coping strategy. For example researchers have categorized coping strategies as "problem focused" versus "emotion focused" coping. The goal of problem-focused coping is to manage or alter the problem causing distress, whereas the aim of emotion-focused coping is to regulate emotional responses to the problem (Folkman & Lazarus, 1980). In a middle-aged community sample, Folkman and Lazarus (1980) found that 98% of accounts of stressors incorporated both problem focused and emotion-focused coping, and they concluded that the conceptualization of coping in terms of defensive processes or problem solving terms is insufficient. Another prominent method of classifying coping is based on the identification of action types, attempts to produce desired outcomes, like primary and secondary control coping. Primary control coping refers to attempts to influence objective events related to the stressor while secondary control coping refers to efforts to maximize one's fit with the current conditions (Rudolph, Dennig, & Weisz, 1995). The use of control strategies has often been used in samples of individuals with severe health problems. Chipperfield and colleagues (2007) found gender differences in control strategies used by men and women who had or had not experienced an acute health event (heart attack or stroke). Women

experiencing an acute health event reported less frequent use of primary control coping and women in general were more likely to use secondary control strategies. Other studies have also looked at control strategies in health problem populations (Endler, Kocovski, & Macrodimitris, 2001; Wrosch, Schulz, & Heckhausen, 2002; Wrosch, Schulz, Miller, Lupien, & Dunne, 2007).

One of the most widely used methods of classifying coping describes strategies that change proximity to the stressor. Approach coping brings the person into closer contact with the stressor and avoidance coping is thought to allow one to withdraw or avert emotional attention away from the stressor (Roth & Cohen, 1986). Just as important as these higher order methods are the lower order categories and discrete instances of coping. Lower order categories of coping include things like problem solving, cognitive avoidance, and wishing. At the lowest level are discrete instances of coping, which include the behaviors, cognitions, and perceptions in which people engage when actually contending with life problems (Skinner, Edge, Altman, & Sherwood, 2003). People might engage in behaviors like trying to ignore the stressor, trying to forget the stressor, or getting advice. People tend to develop coping styles, but often employ a diversity of coping behaviors or patterns across situations. Also notable is the role that type and severity of stressors play in the choice of coping behaviors. Individuals facing a challenge, like starting a new job, use more problem-focused coping, whereas individuals who are facing threat or loss are more likely to rely more on avoidance or emotion focused strategies (McRae 1984). Not only are coping styles important with respect to PTSD symptoms, but they are also related to the course of SUD treatment outcome.

Coping skills, especially avoidant styles of coping, have been implicated in poorer outcome and relapse in SUD patients (Moos & Moos, 2006; Ouimette et al., 1997). One of the leading treatments for alcohol use disorders focuses on the development of appropriate coping skills. Patients who received coping skills training were more likely to be abstinent, have a higher percentage of abstinent days, and report fewer drinks per day than those in the comparison group of standard treatment and assessment (Monti et al., 1993). In a study comparing motivational enhancement treatment and group coping skills, group coping skills training also reduced cocaine and alcohol consumption and the risk for relapse in men and women (Rohsenow et al., 2004). While coping has important implications for PTSD and SUDs, the self-medication hypothesis asserts that drinking itself may function as a coping mechanism for individuals with PTSD.

Drinking as Coping Mechanism

Generally, coping motives for drinking (typically operationalized as drinking to reduce negative affect) are associated with worse drinking outcomes. For example, those who viewed alcohol as a way to cope with daily work stress reported greater alcohol consumption and more alcohol related problems than those participants who did not endorse escapist reasons for drinking (Grunberg, Moore, Anderson-Connolly, & Greenberg, 1999). Greater severity of alcohol problems has also been associated with increased drinking in negative affective situations, whereas fewer alcohol problems were associated with increased drinking in positive affective situations (Cunningham, Sobell, Sobell, Gavin, & Annis, 1995).

Regarding PTSD specifically, the self-medication hypothesis describes substance abuse as a strategy for reducing negative affect. Thus, veterans with PTSD and alcohol

consumption problems may use alcohol to reduce extreme reexperiencing and hyperarousal symptoms. This theory implies that drinking functions as a coping mechanism for PTSD sufferers unable to deal with their symptoms otherwise. A study of adults screening positive for alcohol abuse or dependence and a comparison group found that individuals who relied on more cognitive and behavioral approach coping patterns tend to consume less alcohol and engage in less problem drinking than those who relied on more emotional discharge and avoidance coping (Cooper, Russell, & George, 1988). Individuals using more approach coping are also more likely to remain in remission after treatment. Interestingly, evidence suggests that psychiatric disorders such as PTSD intensify the role of negative emotion in stimulating alcohol related thoughts and urges to drink (Zack, Toneatto, & MacLeod, 1999). In their study of depressives and drinking to cope, Holahan and colleagues (2003) found that the association between depression and drinking behavior was heightened among individuals who report drinking to manage emotional distress.

PTSD, Drinking, and Coping

Coping style has implications for the development and course of PTSD as well as alcohol consumption problems. Coping skill deficits, the use of ineffective behaviors in stressor resolution, reflect a risk factor for developing PTSD and substance abuse problems (Ouimette et al., 1997). In particular PTSD-SUD patients have a tendency to rely on more avoidant and emotion-focused coping strategies while substance specific coping behaviors did not differ between the PTSD-SUD and SUD groups. Additionally, the connection between PTSD and alcohol may become even stronger when PTSD-alcohol abuse patients attribute relapse to PTSD symptoms (Ouimette, Finney, & Moos,

1999). Specifically, the use of avoidant coping styles has been implicated in the development of disorders like PTSD as well as problem drinking (Gil & Caspi 2006, Holahan, Moos, Holahan, Cronkite, & Randall, 2003). Sharkansky and colleagues (2000) looked at approach and avoidance coping in a longitudinal study of Gulf War veterans dealing with combat-related stress and found that individuals who used higher percentages of approach coping manifested lower levels of PTSD symptoms at baseline and 18-24 month follow up. Maladaptive coping has also been implicated in the harmful use of alcohol. Moos and colleagues (1990) found that problem drinkers who tended to rely more on avoidance coping strategies had more drinking problems, psychological and physical symptoms, and less self-confidence. Research also indicates that drinking maintained by negatively reinforced motives has a stronger relationship to alcohol related problems than drinking maintained by positive ones (Martens, Ferrier, & Cimini, 2007). Due to the highly stressful and dangerous nature of their occupation veterans seem to be at an inordinate risk for adopting maladaptive coping strategies, which in turn put them at greater risk for developing psychological and behavioral health problems. Ouimette and colleagues (1997) found that coping style might play a role as mediator between PTSD and substance abuse. In their study of substance abuse treatment outcome comparing those with only a diagnosis of substance abuse to others with comorbid substance abuse and Axis-I psychological disorders, Ouimette and colleagues found that at 1-year follow-ups the substance abuse (SA) PTSD patients improved on the outcomes of alcohol consumption, alcohol dependence, and problems from substance abuse, but did not improve on psychological symptoms, employment, legal status, or support from friends. In contrast the SA-only group and SA-Psychological Disorder (Other Axis I) group

improved on all outcomes except support from friends. They also found that emotional discharge coping partially mediated the effect of PTSD on substance use. These findings suggest that SA-PTSD patients have additional barriers to recovery from their symptoms and that the methods of coping commonly used in this population may be a factor in this difficulty recovering.

Drinking Motives

Cooper's (1995) motivational model asserts that people drink alcohol in order to modulate positive as well as negative emotions and that drinking to cope and drinking for enhancement purposes represent distinct phenomena. Cooper defines a five dimensional model of drinking motives that includes drinking for social reasons, enhancement purposes, to conform, and drinking to cope with anxiety as well as depressive symptoms (Grant, Stewart, O'Connor, Blackwell, & Conrod, 2007). Another way of understanding the role of self-medication in a person's drinking is by assessing a person's perceptions of how their drinking relates to their PTSD symptoms. The self-medication hypothesis assumes that drinking by PTSD sufferers is related to the alleviation of psychological distress caused by the disorder and is thus negatively reinforced. Recent laboratory study findings have supported the self-medication premise that negative emotion is a trigger for alcohol craving (Coffey, Stasiewicz, Hughes, & Brimo, 2006; Saladin et al., 2003). Several studies have demonstrated the relationship of drinking motives to alcohol abuse and psychological problems. In a longitudinal study of drinking among depressed persons, drinking to cope strengthened the relationship between alcohol consumption and symptoms of depression (Holahan et al., 2003). In a study of anxiety sensitivity in alcoholism treatment patients, Kushner and colleagues (2001) found that syndrome-

related anxiety symptoms and trait anxiety mediated the relationship between anxiety sensitivity and self-reported use of alcohol for coping with anxiety symptoms. In another study, the relationship between trauma symptoms (i.e., domestic violence victimization) and alcohol consumption was mediated by drinking to cope (Kaysen et al., 2007).

Drinking motives has shown to be an important factor in the maintenance of alcohol use in various populations and may play a key role in the alcohol consumption of veterans with PTSD. The literature on self-medication would suggest that veterans with PTSD may be more likely to endorse coping motives for drinking. These subjective reasons for drinking appear to be important in determining the role of alcohol in relationship to veterans' psychological symptoms.

Motivation to Change Substance Use

Motivation has long been considered to be a critical target for intervention with substance abusing individuals. Motivation can generally be defined as one's interest in the need for change, goals and intentions, need to take responsibility for change, and sustaining behavior and incentives for change (DiClemente, Nidecker, & Bellack, 2008). Motivation to change one's drinking habits has been related to frequency of alcohol consumption, alcohol related problems, as well as life satisfaction (Miller & Tonigan, 1996; Shealy, Murphy, Borsari, & Correia, 2007). Motivation to change substance use has been studied in various aspects of treatment outcome with mixed results. Carbonari and DiClemente (2000) found that subjects with a stronger endorsement of action on the University of Rhode Island Change Assessment (URICA) were more likely to remain abstinent than those who had lower scores on the action subscale. Readiness to change also mediated the effects of brief motivational intervention on alcohol related

consequences for those participants with high motivation to change, but not for those with low motivation (Stein et al., 2009). A study on the process of smoking cessation found that motivation predicted quitting attempts as well cessation success at 1-month and 6-month follow-ups (DiClemente et al., 1991). Contrary to these findings, in a cross-examination of three studies, Borsari and colleagues (2009) found that, although treatment increased motivation, motivation did not mediate reductions in alcohol consumption or alcohol related problems. Though the role motivation to change plays in treatment outcome and retention is unclear, it is viewed as a potentially important factor in treatment. Despite the importance placed upon the role of motivation in substance abusing individuals, there seems to be a lack of information on variables related to motivation to change drinking as well as motivation or readiness to change among individuals with serious mental illnesses (Shealy et al., 2007; DiClemente et al., 2008).

The Present Study

The purpose of the present study was to explore the role of coping style and drinking motives in relation to PTSD and alcohol abuse. Studies have examined the relationship between coping and PTSD in veterans, and found that maladaptive coping styles are predictive of a PTSD diagnosis (Sutker, Davis, Uddo, & Ditta, 1995). Other researchers examined the relationship between PTSD and substance use in veterans. The relationship between PTSD and alcohol abuse has been the focus of a number of studies though findings concerning the mechanisms driving the relationship have been inconsistent (Shipherd et al., 2005). Coping skills are a set of behaviors that hold strong direct and indirect relationships to drinking motives. Drinking could function as a person's primary method of coping with stress. Drinking could also result from the

utilization of an ineffective set of coping behaviors that may reflect an avoidant style of coping, which may be ineffective. An important factor therein is one's own perception of the relationship between PTSD symptoms and alcohol consumption, or a person's stated motives for drinking. Understanding more about the way one copes as well as their perception of why they are drinking can be important to understanding the relationship between PTSD and alcohol abuse. This study seeks to extend the research on PTSD and alcohol use in veterans by incorporating the assessment of coping behaviors, drinking motives, and a more detailed measure of alcohol problems than used in previous studies.

Overall, coping and drinking motives may be important to assess in conjunction with motivation to change one's drinking. Despite extensive research in these areas, it seems that there is still not much research examining the relationship between coping skills and drinking behavior in individuals with psychiatric disorders other than depression (Holahan et al., 2003). Veterans from the wars in Afghanistan and Iraq (OEF/OIF) are returning from their deployments with high levels of combat exposure and increased risk for adopting maladaptive coping patterns. This study examined the coping styles and drinking motives of OEF/OIF veterans as potential mediators of PTSD-AUD problems.

Hypotheses

Hypothesis 1: PTSD is associated with high rates of alcohol consumption. Individuals with this disorder tend to attempt to cope with their anxiety symptoms through the use of alcohol. Alcohol use as a primary method of coping has negative implications for a person's life in a number of domains (i.e., physical health, psychological health and interpersonal relationships). We predicted that PTSD, as

measured by total severity score on the CAPS, would predict drinks per drinking day as measured by the Timeline Follow Back. PTSD sufferers would have a greater level of alcohol abuse severity than those without the disorder as evidenced by a higher number of drinks per day drinking (Timeline Follow Back), a greater number of consequences in the past three months endorsed on the Drinkers Inventory of Consequences (DrInC), and a lower level of motivation to change their drinking (Readiness to Change Questionnaire).

Hypothesis 2: The development and maintenance of PTSD is related to the use of maladaptive coping styles. The development and maintenance of problematic alcohol consumption for PTSD sufferers is related to motives for drinking. We predicted that participants with PTSD would endorse more baseline drinking motives of coping with anxiety and depressive symptoms (as measured by the Modified Drinking Motives Questionnaire-Revised: DMQ-R) and more avoidant methods of coping (as measured by the Coping Responses Inventory: CRI) than participants without PTSD.

Hypothesis 3: We predicted that coping response style and drinking motives would mediate the relationship between PTSD and alcohol consumption. According to the self-medication hypothesis, PTSD symptoms drive alcohol consumption as a means of dealing with psychological distress caused by the disorder. Drinking motives have been shown to mediate the relationship between psychological distress and alcohol abuse in other populations, and deficiencies in coping have been related to the development of PTSD as well as substance abuse. In accordance with Baron and Kenny's (1986) requirements for testing mediation, it is necessary that the predictor variable (PTSD in this case) be significantly correlated with the mediating variables (coping response and

drinking motives) as well as the dependent variable (alcohol consumption). We expected that PTSD would be significantly correlated with alcohol consumption. We also expected that coping responses dominated by avoidant methods of coping, and motives for drinking related to coping with anxiety and depressive symptoms would each be significantly correlated with alcohol consumption. In testing for mediation, when the paths from PTSD to coping style and drinking motives, and the paths between coping style and drinking motives to alcohol consumption were statistically controlled for, the magnitude of the association between PTSD and alcohol consumption would be eliminated or substantially reduced. Finally, we expected that coping style and drinking motives would also mediate the relationship between PTSD and alcohol-related consequences.

Method

Participants

The sample was comprised of 60 Operation Enduring Freedom and Operation Iraqi Freedom (OEF/OIF) veterans seeking primary care services at Memphis Veterans Affairs Medical Center facilities who were recruited for a study of a brief alcohol intervention. Veterans recruited for this project were approached during their medical appointments at a specialty primary care clinic for OEF/OIF veterans. The majority of participants ($N = 53$) were male (88.3%) and the mean age of participants was 32.2. The criterion for inclusion in the study was a score of at least 8 on the Alcohol Use Disorders Identification Test (AUDIT: Babor, Higgins-Biddle, Saunders, & Monteiro, 2001), suggesting alcohol misuse.

Measures

Clinician Administered PTSD Scale (CAPS). The CAPS (Blake et al., 1995) is a 30-item semistructured clinical interview assessing the frequency and intensity of the 17 symptoms of PTSD based on DSM-IV-TR criteria. Interviewers rate the frequency and intensity of each PTSD symptom on separate 5-point scales ranging from 0 to 4. The CAPS can be scored as a continuous measure with the frequency and intensity ratings combining for scores ranging from 0 to 136. The CAPS can also be used as a diagnostic tool when used in this manner a score of 1 for the frequency and 2 for the intensity typically is acknowledged as the presence of the symptom (F1/I2). The CAPS has shown good internal consistency reliability in a sample of combat veterans with severity scores for the three symptom clusters ranging from .85 to .87 and internal consistency for all 17 symptoms at .94 (Blake et al., 1995).

Timeline Follow Back (TLFB). The TLFB (Sobell & Sobell, 1996) is an assessment method used to obtain a participant's estimated substance use over the past month. With the aid of a calendar participants report the number of standard drinks consumed on each day for the past 30 days as well as drug use. The TLFB is useful for obtaining precise estimates of alcohol and drug use. The Timeline Follow back provides valuable information about the pattern, variability, and magnitude of alcohol and other substance use. The Time Line Follow Back has shown good psychometric properties in a sample of psychiatric outpatients with schizophrenia or major mood disorders demonstrating 30-day test-retest correlations ranging from .73 (heavy drinking days) to 1.00 (total drinks) (Carey, Carey, Maisto, & Henson et al., 2004).

Change Ladder. The contemplation to Change Ladder (Biener & Abrams, 1991) is a measure designed to assess readiness to change alcohol and other substance use. The measure depicts a ladder with ten rungs, where each rung indicates a stage in a participant's readiness to change. The anchor points are at (0) "no thoughts of changing", (2) "think I need to consider quitting someday", (5) "think I should quit, but not ready", (8) "starting to think about how to change my drinking pattern", (10) "taking action to quit". In a sample of chemical dependent inpatients, Change Ladders showed good test-retest reliability across a brief 10-minute time span with retest reliabilities ranging from .82 to .98 (Carey, Purnine, Maisto, & Carey, 1999).

Drinker Inventory of Consequences (DrInC). The DrInC (Tonigan & Miller, 2002) is a 50-item self-report measure assessing adverse consequences related to alcohol abuse in five domains: Interpersonal, Physical, Social, Impulsive, and Intrapersonal. Each item includes a lifetime score where the participant can endorse "Yes" or "No" this has happened to me. Each item also includes a score for the frequency with which this event has occurred in the past three months. The past three months elicits responses from participants on a 4-point Likert scale that ranges from (0) "Never" to (3) "Daily or almost every day". In a sample of alcohol abusing adults, the DrInC showed good internal consistency reliability at .93 (Blume et al., 2006).

Modified Drinking Motives Questionnaire-Revised (DMQ-R). The Modified DMQ-R (Grant et al., 2007) is a 28-item measure of coping methods related to drinking with each item loading onto one of five subscales: social, coping-anxiety, coping-depression, enhancement, or conformity. In this model, motives are divided into five dimensions, four of which are categorized by type of reinforcement positive or negative,

and the source of reinforcement internal or external. In this model, external reinforcement includes social (positive reinforcement) and conformity (negative reinforcement) with the internal reinforcement including enhancement (positive reinforcement) and coping with anxiety and depression (negative reinforcement). Participants are asked to evaluate any motives they may have for drinking alcohol and to indicate on a 5-point scale ranging from 1 (never) to 5 (almost always) how often they drink for each motive listed. In a sample of undergraduate students, the modified DMQ-R showed adequate internal consistency reliability with subscale internal consistencies ranging from .66 to .91 (Grant et al., 2007).

Coping Responses Inventory (CRI). The CRI (Moos, 1993) is a 48-item measure consisting of eight subscales comprised of 6 items each. Participants are asked to focus on a stressor in their life occurring in the past year and to rate their use of particular coping strategies for each of the 48 items. Respondents are asked to rate how often they rely on a particular coping strategy based on a 4-point Likert scale anchored at not at all (0) and fairly often (3). One of the main methods of scoring the CRI uses the 24-items of the approach and avoidance coping scales. Each of these subscales can also be split into cognitive and behavioral strategies: logical analysis, positive reappraisal, seeking guidance/support, problem solving, cognitive avoidance, resigned acceptance, seeking alternative rewards and emotional discharge. Approach coping includes methods of coping, which theoretically afford the opportunity for instrumental action and integration of stressful experiences while avoidance coping, may alleviate distress and provide safety or conservation of resources in taxing circumstances. The approach and avoidance scales

of the CRI have shown good internal consistency reliability in a sample of Gulf War veterans, with reliabilities of .89 and .85 respectively (Sharkasny et al., 2000).

Procedure

Veterans were recruited at their first visit to a specialty clinic for OEF/OIF veterans. The study was described to potential participants as a project involving the examination of returning OEF/OIF veterans and their post-deployment adjustment, with particular emphasis on health and health-related behaviors. Participants were invited to complete a screening packet consisting of several brief questionnaires, which took 15-20 minutes to complete. They were then entered into a drawing for a \$50 Visa gift card. Participants were informed that participation in the project was completely voluntary, and consent was elicited prior to completing the questionnaires.

Participants meeting the inclusion criteria were contacted to schedule a baseline appointment with a trained research assistant. At this baseline appointment, the research assistant explained the study, and conducted a second informed consent procedure. After the veteran gave informed consent to participate, the research assistant conducted the baseline assessment session, which included structured clinical interviews and questionnaires inquiring about psychological symptoms, substance abuse, and other facets of the veterans deployment and readjustment.

Following the baseline session, participants were randomly assigned to an intervention. Participants were either assigned to complete a brief motivational intervention where they received feedback from a therapist or they were assigned to receive the feedback and psychoeducational material without the therapist's intervention. Both interventions included information intended to encourage veterans to reduce their

alcohol and drug use. The data used for this study's analyses came from baseline interviews.

Data Analysis Plan

To test hypothesis 1, assessing the impact of PTSD on alcohol consumption, the number of drinks per drinking day (Timeline Follow Back) was regressed on PTSD total severity scores (CAPS). To assess for differences between PTSD and non-PTSD participants on alcohol consumption severity, an analysis of variance was run to determine whether the PTSD and non-PTSD groups differed in their number of drinks per drinking day (Timeline Follow Back), number of consequences related to drinking (Drinker Inventory of Consequences), and motivation to change their drinking (Motivation Ladder).

To test hypothesis 2 analyzing the difference between PTSD and non-PTSD participants on drinking motives (Modified Drinking Motives Questionnaire-Revised) and use of coping behaviors (Coping Responses Inventory) an analysis of variance was run to differentiate between the groups.

In testing hypothesis 3, examining the potential mediation of coping style and drinking motives on the relationship between PTSD and alcohol, a series of linear regressions were implemented with PTSD predicting alcohol consumption in the first regression, PTSD predicting coping in the second regression, PTSD, and the full model with PTSD and coping predicting alcohol consumption in the final regression. These steps were again followed entering drinking motives as the mediator in the second regression and the full model. In accordance with the Baron and Kenny (1986) model of

mediation correlations were run between PTSD and alcohol consumption and potential mediators:

Coping

- 1) Approach Coping
- 2) Avoidance Coping

Drinking Motives

- 1) Coping-Anxiety
- 2) Coping-Depression

Variables that showed significant bivariate correlations between mediator subscales and PTSD were entered into the second regression. Avoidance coping from the CRI, and coping-anxiety, and coping-depression from the DMQ-R were expected to mediate the relationship between PTSD and alcohol consumption. When these mediators were entered into the regression, it was expected that PTSD would no longer significantly predict alcohol consumption. Next, the potential mediation of the relationship between PTSD and alcohol-related consequences by drinking motives was assessed. Alcohol-related consequences scales in which the PTSD and non-PTSD groups differed were used as dependent variables. CRI and DMQ-R scales that were significantly correlated with both PTSD severity score and alcohol-related consequences were entered as mediators. The drinking to cope with anxiety and drinking to cope with depression scales were combined to create a scale of drinking to cope with negative affect. The Baron and Kenny (1986) recommendations were then followed to assess mediation between PTSD severity and alcohol-related consequences by drinking to cope with negative affect. We followed these analyses with Preacher and Hayes (2004) suggestions for tests of mediation using

the Sobel test, which compares the indirect effect of the independent variable on the dependent variable to the point null hypothesis that it equals zero.

Results

Using the F1/I2 scoring rule on the Clinician Administered PTSD Scale, 55% ($N = 33$) screened positive for PTSD. The mean total severity score on the CAPS for the sample was 51.2. The average percentage of days abstinent from alcohol was 65.2%, with participants averaging 5.74 drinks per drinking day, and 16.8% of drinking days including binge episodes (see Table 2).

Table 2 Outcome Measures Descriptive Data

	Male M(SD)	Female M(SD)
PTSD		
CAPS Total Severity	51.92(25.88)	45.29(23.01)
TLFB		
Percent Days Abstinent (%)	63.46(27.90)	78.57(11.84)
Drinks Per Drinking Day	6.08(3.46)	3.29(1.50)
Percent Binge Days (%)	17.92(23.07)	8.10(9.40)
Motivation Ladder		
	4.06(3.46)	4.33(4.46)
CRI		
Logical Analysis	9.06(3.62)	10.14(5.08)
Positive Reappraisal	9.15(4.15)	8.14(6.04)
Seeking Guidance	8.28(3.40)	9.14(2.27)
Problem Solving	10.09(4.18)	12.14(3.67)
Cognitive Avoidance	9.25(4.27)	9.43(5.32)
Acceptance or Resignation	8.70(3.99)	10.14(3.80)
Seeking Alternative Rewards	5.36(3.60)	8.29(6.40)

Table 2 Outcome Measures Descriptive Data

Emotional Discharge	6.68(3.47)	9.86(2.54)
DMQ-R		
Social	12.96(4.88)	13.86(7.67)
Coping (Anxiety)	10.40(4.50)	11.43(5.41)
Coping (Depression)	21.17(11.41)	22.29(14.37)
Enhancement	12.43(4.99)	13.57(8.66)
Conformity	6.19(2.62)	5.71(1.50)
DrInC		
Physical	2.78(2.78)	1.33(1.37)
Interpersonal	2.14(2.44)	1.67(3.14)
Intrapersonal	2.35(4.21)	1.00(.89)
Social Responsibility	1.29(2.02)	.33(.82)
Impulse	2.90(3.03)	1.00(1.00)

To test hypothesis 1, assessing the impact of PTSD on alcohol consumption, we conducted a linear regression with drinks per drinking day as the dependent variable, and CAPS total severity scores as the sole predictor. PTSD severity, as measured by the CAPS, was not a significant predictor of mean drinks per drinking day, percentage of days abstinent from alcohol consumption, or percentage of binge drinking days in the past month. To determine differences between the PTSD and non-PTSD groups on alcohol consumption variables, we ran three analysis of variance (ANOVA) tests. An ANOVA with PTSD diagnosis (PTSD positive vs. PTSD negative) as the independent variable and number of drinks per drinking day as the dependent variable was not significant. There were no differences between the PTSD and non-PTSD groups on percentage of days abstinent from alcohol consumption or percentage of binge drinking days. We also conducted ANOVAs to assess group differences (PTSD/non-PTSD) on the 5 scales of the DrInC. Differences emerged on interpersonal consequences ($F(1, 53) =$

4.18, $p = .016$). The groups did not differ on physical consequences, intrapersonal consequences, social responsibility, or impulse control. Despite the inclusion criteria of scoring at least an 8 on the AUDIT, indicating a pattern of hazardous drinking, 3 participants reported completely abstaining from drinking at the baseline assessment. These participants were removed from analyses and all analyses were re-conducted. The results of all of the analyses without abstainers remained the same except for 2 of the alcohol-related consequences scales. Significant differences emerged between the PTSD ($M = 3.74$, $SD = 3.58$) and non-PTSD ($M = 1.89$, $SD = 1.69$) groups on drinking consequences related to impulse control ($F(1, 52) = 5.90$, $p = .019$). Differences also emerged between the PTSD ($M = 1.78$, $SD = 1.98$) and non-PTSD ($M = .67$, $SD = .82$) groups on drinking related social responsibility consequences ($F(1, 49) = 4.27$, $p = .044$). The groups did not differ on motivation to change their alcohol consumption as measured by the contemplation to change ladder.

To test our second hypothesis analyzing differences between PTSD and non-PTSD participants on drinking motives and coping behaviors a series of ANOVAs compared groups on the 5 scales of the DMQ-R and the eight scales of the CRI. The PTSD and non-PTSD groups did not differ on the DMQ-R scales of drinking with social motives, enhancement purposes, or conformity. As expected an ANOVA did yield significant differences between the PTSD group ($M = 11.91$, $SD = 4.56$) and non-PTSD group ($M = 8.81$, $SD = 4.06$) on drinking to cope with anxiety ($F(1, 58) = 7.53$, $p = .002$). Also as expected, a significant difference emerged on the drinking to cope with depression scale ($F(1, 58) = 11.64$, $p < .001$) with the PTSD group ($M = 25.58$, $SD = 11.81$) again scoring higher than the non-PTSD group ($M = 16.07$, $SD = 9.24$). On the

CRI, there were no differences between the PTSD and non-PTSD group on the scales of logical analysis, positive reappraisal, seeking guidance, problem solving, cognitive avoidance, or acceptance and resignation. ANOVA did indicate significant differences between the groups in coping by seeking alternative rewards ($F(1, 58) = 7.70, p = .012$), such that the non-PTSD group ($M = 7.22, SD = 4.48$) scored higher than the PTSD group ($M = 4.45, SD = 3.23$) on this scale. A significant difference was also found on the emotional discharge scale ($F(1, 58) = 15.98, p < .001$), with the PTSD group ($M = 8.52, SD = 3.03$) scoring higher than the non-PTSD group ($M = 5.26, SD = 3.27$).

The guidelines detailed by Baron and Kenny (1986) were followed to test our third hypothesis. In accordance with these guidelines, correlations were run between PTSD severity scores and drinks per drinking day, percent days abstinent, and percent binge drinking days. PTSD severity scores were not predictive of any of the alcohol consumption or frequency variables; because of these non-significant results the conditions were not met to evaluate a mediation model. PTSD severity scores did demonstrate relationships to 2 aspects of drinking related consequences, which fit the requirements for mediation analysis.

To establish a basic relationship between the model's variables, correlations between the drinking motives and coping scales, PTSD severity scores, and drinking related interpersonal and impulse control consequences were computed. Of the coping behaviors and drinking motives, only drinking to cope with anxiety and drinking to cope with depression evidenced a relationship between PTSD severity scores and the 2 alcohol-related consequences suitable for a test of mediation. The drinking to cope with anxiety and drinking to cope with depression scales of the DMQ-R were then combined

to create a scale addressing drinking to cope with negative affect. To assess mediation of the relationship between PTSD severity and alcohol-related consequences by drinking to cope with negative affect, the Baron and Kenny (1986) recommendations for testing mediation were followed. First, drinking related interpersonal consequences was regressed on PTSD severity scores ($F(1, 53) = 7.34, p = .009$). Next, the mediator drinking to cope with negative affect was regressed on PTSD severity ($F(1, 58) = 30.83, p < .001$). Finally, drinking related interpersonal consequences was regressed upon both drinking to cope with negative affect and PTSD severity scores ($F(2, 52) = 11.48, p < .001$). With PTSD severity in the regression equation, drinking to cope with negative affect continued to significantly affect drinking related interpersonal consequences ($p < .001$) while PTSD severity no longer affected interpersonal consequences, ($p = .86$) meeting the conditions for the mediation model. This analysis was followed by the suggestions of Preacher and Hayes (2004) using the Sobel test of mediation. Here the Sobel test confirmed the Baron and Kenny (1986) strategy suggesting full mediation ($z = 3.05, p = .0023$). Demonstrating that the indirect effect of PTSD on interpersonal consequences through drinking to cope with negative affect was significant.

We employed The Baron and Kenny (1986) model for testing the mediation of PTSD severity and drinking related impulse control consequences by drinking to cope with negative affect. PTSD severity was predictive of drinking related impulse control consequences ($F(1, 55) = 4.66, p = .035$). The mediator drinking to cope with negative affect was then regressed on PTSD severity ($F(1, 58) = 30.83, p < .001$). Finally, drinking related impulse control consequences was regressed upon both drinking to cope with negative affect and PTSD severity ($F(2, 54) = 7.09, p = .0018$). Drinking to cope with

negative affect maintained its affect on drinking related impulse control consequences ($p = .004$) while drinks per drinking day no longer significantly affected interpersonal consequences ($p = .97$). The Sobel test of mediation confirmed the Baron and Kenny (1986) model suggesting full mediation ($z = 2.60, p = .009$) and demonstrating that the indirect effect of PTSD severity on impulse control consequences through drinking to cope with negative affect was significant.

Discussion

The purpose of the present investigation was to examine the relationship between PTSD symptoms, coping styles, and drinking motives in a sample of heavy-drinking OEF/OIF veterans. Prior research has focused on either coping behavior or drinking motives in relation to the development of PTSD and alcohol misuse in veterans. This study emphasizes the importance of understanding both coping behaviors and a veterans' subjective perception of the function of their alcohol consumption. The comparison group for this study was particularly stringent given the fact they were heavy drinking returning veterans who were likely to have experienced a trauma related to their military deployment. The self-medication hypothesis asserts that individuals with PTSD consume alcohol in attempt to alleviate their psychological distress. Although the development of alcohol abuse post the development of PTSD has been used as a hallmark of this relationship it does not take into account the motives of the individual. Assessing clients' coping skills as well as the motivation behind their drinking can help to illuminate the relationship between PTSD and alcohol consumption and alcohol related problems.

In this sample, PTSD severity was not associated with the frequency or quantity of alcohol consumption variables and the PTSD and non-PTSD groups did not differ on

these variables. Our sample consisted of individuals who were identified as heavy drinkers by their scores of 8 on the AUDIT, so the absence of a relationship between PTSD and alcohol consumption may have been due to a restriction in range. Although most studies have reported relationships between PTSD and alcohol consumption, there have been other prior studies reporting no significant association in samples of Vietnam and Persian Gulf War veterans (Miller, Vogt, Mozley, Kaloupek, & Keane, 2006; Shipherd et al., 2005). In the full sample, in the area of alcohol-related consequences, the groups only differed on interpersonal consequences, with the PTSD group evidencing a greater number of consequences than the non-PTSD group. When abstainers were excluded, differences emerged between the PTSD and non-PTSD groups on alcohol-related consequences related to impulse control and social responsibility. These findings are consistent with a number of studies indicating that individuals with PTSD tend to have more problems from their alcohol consumption than individuals without PTSD, even those with other psychological disorders (Laffaye, Cavella, Drescher, & Rosen, 2008; Oquendo et al., 2005; Ouimette, et al., 1997; Ouimette et al., 1999). This higher number of alcohol related consequences are especially notable given the fact that participants with PTSD were not differentiated from those without PTSD on alcohol frequency or consumption variables.

Additionally, the PTSD and non-PTSD groups did not differ in their motivation to change their alcohol consumption. Although participants with PTSD experienced more negative consequences as a result of their alcohol consumption it is possible that the types of consequences they experienced at greater rates did not increase their motivation to change. Blume and colleagues (2006) found that only intrapersonal consequences were

related to motivation to change alcohol consumption. Zhang and colleagues' (2004) findings in a population with severe and persistent mental illness corroborate this, indicating that awareness of one's alcohol problems is important for change to occur. As expected, PTSD sufferers were more likely than the non-PTSD group to endorse coping motives for consuming alcohol, including drinking to cope with anxiety and drinking to cope with depression. Participants with PTSD were also more likely to use maladaptive avoidant coping behaviors, specifically emotional discharge coping, than their non-PTSD counterparts. Interestingly, we also found that participants without PTSD were more likely to seek alternative rewards as a coping mechanism than participants with PTSD. The CRI classifies seeking alternative rewards as an avoidant coping behavior indicating that it is a behavior that does not lend itself to resolution of the stressor, though we found that seeking alternative rewards was negatively correlated with PTSD symptom severity. This scale includes items like "Get involved in new activities" and "Spend more time in recreational activities", behaviors that may in fact be adaptive both in terms of alleviating negative affect and reducing substance abuse, but do not afford one the ability to deal with the stressor. Research shows that posttraumatic growth, positive changes in one's beliefs or functioning as a result of struggle, shares a positive correlation with seeking alternative rewards as a coping behavior (Sawyer & Ayers, 2009; Widow, Jacobsen, Booth-Jones, & Fields, 2005). It is possible that seeking alternative rewards functions as a better alternative coping method than behaviors like coping motivated alcohol consumption.

With respect to the mediational analyses, our hypothesized mediators of drinking to cope with anxiety, drinking to cope with depression, cognitive avoidance, seeking

alternative rewards, and emotional discharge were significantly correlated with PTSD severity. As noted above PTSD severity was not correlated with alcohol consumption, but did show significant relationships to specific aspects of negative consequences of drinking, such as interpersonal and impulse control consequences. Mediation analyses showed that drinking to cope with negative affect fully mediated the relationship between PTSD severity and drinking related interpersonal consequences and impulse control consequences. Several studies have demonstrated drinking to cope as a mediator between PTSD symptoms and alcohol consumption, but these studies have not investigated drinking related consequences as a dependent variable (Kaysen et al., 2007; O'hare, Shen, & Sherrer, 2010; Stewart, Mitchell, Wright, & Loba 2004). These findings are consistent with research showing that more severe drinking problems are associated with greater levels of drinking in negative affective situations (Cunningham et al., 1995), other studies have found that drinking motives demonstrated a strong relationship with alcohol-related consequences (Cooper et al., 1995; Yusko, Buckman, White, & Pandina, 2008), and that drinking motives have been found to mediate the relationship between personality disorder symptoms and alcohol-related consequences (Tragesser, Sher, Trull, & Park, 2007).

The present findings are also consistent with other findings (Ouimette et al., 1997; Sharkansky et al., 2000) suggesting that these veterans are at an increased risk for detrimental consequences related to the adoption of maladaptive coping behaviors like emotional discharge behaviors, although seeking alternative rewards showed a negative relationship with PTSD symptoms. In addition to this a veteran's motives for drinking appear to be an important factor in the relationship between PTSD symptomatology and

alcohol-related consequences. Specifically, coping motives for drinking seem to be an important link leading to significantly more problems with alcohol consumption in veterans with PTSD. It is important to take note of the fact that in the absence of differences in alcohol consumption, the PTSD group evidenced these higher rates of consequences than the non-PTSD group. These findings may indicate that a person's reason for drinking may be related to the lack of a repertoire of more adaptive coping responses. This also highlights the importance of assessing patients' motives for drinking and teaching coping skills to clients. It is also important for clinicians to be acutely aware of alcohol consumption in patients with PTSD given the fact that they are more prone to experiencing negative consequences related to their alcohol consumption.

The cross-sectional nature of this study limits causal interpretations. Additionally, the limited number of female veterans in the sample precludes an examination of the role of gender. Another potentially important limitation of the study is small sample size. Despite the small sample we obtained significant results for many of our hypotheses. Future research should use longitudinal methods to determine order of onset of PTSD and alcohol abuse in conjunction with coping behaviors and drinking motives. Drinking motives measures assessing motivation to drink alcohol specifically geared towards PTSD symptoms may elucidate the relationship between PTSD, motives, and consequences. Drinking motives measures such as the DMQ-R assess general coping motives. Measures assessing whether patients are drinking to deal with reexperiencing, hyperarousal, or as a form of avoidance may give a better understanding of the subjective function of alcohol consumption in relation to PTSD. Assessing a patient's perception of the specific PTSD symptoms they are attempting to alleviate through their alcohol

consumption would give a clearer picture of self-medication as well as where to intervene with a problem drinker.

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